A Paper was read, entitled, "Description of a Graphical Register of Tides and Winds." By Henry R. Palmer, Esq., Civil Engineer. Communicated by J. W. Lubbock, Esq. V.P. & Treas. R.S.

The author having long directed his attention to the effects likely to be produced on the tides in the river Thames, in the port of London, by the removal of London Bridge, was desirous of obtaining a series of accurate observations during all the changes of the tides; and for this purpose constructed a machine, which, being acted upon jointly by a time-piece and by a float resting on the water, registered of itself, upon a piece of paper, both the height of the tide, and the direction of the wind.

A number of parallel and equidistant lines, representing feet in height, are engraved and printed on long sheets of paper, the ends of which are joined together until a sufficient length is obtained for the purpose required. This long sheet is wound upon a brass roller, which is placed near the lower part of a cylinder one foot in diameter, so that the paper may pass round it; its contact being preserved by a roller above, pressing upon it by its own weight. On the axis of the cylinder is a toothed wheel, which is acted upon by a clock, producing an equable motion in the cylinder, which is thus made to complete one revolution in six hours. By means of another wheel, at the expiration of every hour a hammer is raised, whose fall strikes on an upright punch connected with a weather-cock on the top of the building; and the figure of an arrow being cut on the lower end of this punch, an impression of the arrow is made upon the paper: as the direction of the arrow always corresponds with that of the wind, the direction of the latter is thus hourly registered.

Immediately over the axis of the cylinder, and parallel with it, is a rack carrying a pencil. The rack is acted upon by a pinion, which receives its motion from the float on the water: so that as the tide rises or falls, the pencil is moved backwards and forwards through a space which bears a determinate ratio to the actual rise or fall of the float: and thus, by the combined motions of the cylinder and of the pencil, the one regulated by the clock and the other by the tide, a line is traced on the paper, giving a representation of both.

The float, which rests on the water, is a hollow plate iron vessel, suspended by a chain, which passes twice round a light cast-iron barrel, and then descends, having a counter weight attached to it. The float is placed in a well communicating with the river, through a fine wire gauze, which prevents the undulations of the surface from affecting the water in the well.

The author concludes by an account of an application of similar machinery to the determination of the precise times of high water, and the construction of accurate tide tables. He proposes, with this view, an instrument which shall record the height of the tide at every minute, and promises to give to the Society a full description of such a machine when it shall have been completed.

His Royal Highness then addressed the Meeting, informing them that by the express command of His Majesty, He, together with the

The Royal Society is collaborating with JSTOR to digitize, preserve, and extend access to *Abstracts of the Papers Printed in the Philosophical Transactions of the Royal Society of London.* www.jstor.org

Council of the Society, had that morning waited upon His Majesty at St. James's Palace, for the purpose of witnessing the inscribing of the Royal Signature in the Charter Book of the Society, conformably with the intention which His Majesty had been graciously pleased to express through the Right Hon. Robert Peel, the Secretary of State for the Home Department, in answer to an Address presented to His Majesty by the President and Council, in the name of the Society, in the month of July last.

His Royal Highness stated that he on this occasion addressed the King to the following effect:

"Sire,

"May it please Your Majesty,

"The President and Council of the Royal Society, instituted for the promotion of natural knowledge, in obedience to your commands, now appear in Your Majesty's presence, and humbly crave your gracious permission to lay before you the Volume of their Registry for the insertion of your Royal Signature as Patron of their Institution. Under the fostering care of Your Majesty's predecessors this Society has constantly laboured for upwards of one hundred and seventy years in the pursuit of those objects for which it was originally instituted. This further proof of Your Majesty's favour and patronage will give an additional stimulus to our exertions in the promotion of natural knowledge.

"While we venture once more to return you our most humble and sincere thanks for the assurances it has pleased you, Sire, to give to us of enjoying your Royal Favour, may we be permitted, in unison with all classes of Your Majesty's faithful and loyal subjects, to offer up our most fervent prayer to the Ruler of all Princes and Kingdoms, for the health, the prosperity, and the happiness of our Most Gracious Sovereign, the patron of every charitable, scientific, and liberal institution."

To this address His Majesty was pleased to return a most gracious answer; expressing the high sense he had always entertained of the value and importance of science in conducing to the prosperity, the happiness, and the glory of nations,—an opinion which he had been led to form in early life by witnessing, while engaged in the service of his profession in the navy, the immense practical advantages which result from the cultivation of science; and assuring the Society of his earnest desire to promote their objects and foster their exertions in so excellent a cause as that in which they are engaged; and of his anxious wish that they should cordially cooperate with the scientific and learned men of other countries in the same laudable endeavours to enlarge the boundaries of human knowledge.

His Majesty signed his name, in a leaf prepared for the purpose, in the Charter Book, as Patron of the Royal Society.

The Members of the Council were then severally presented to His Majesty by His Royal Highness, and had the honour of kissing His Majesty's hand.

His Royal Highness proceeded to state, that himself, attended by the Council, had afterwards the honour of presenting the following Address to Her Majesty, by whom they were most graciously received.

"To the Queen's Most Gracious Majesty,

"May it please Your Majesty,

"As President of the Royal Society of London for improving natural knowledge, permit me, Madam, on behalf of that body, to lay before Your Majesty an humble but sincere avowal of the deep respect and entire attachment which every Member of our Society entertains for Your Majesty's most gracious person, for the Royal and illustrious Consort of our beloved and venerated Monarch, His Most Gracious Majesty King William the Fourth.

"It is not, perhaps, unknown to Your Majesty, that the Society over which I have the honour to preside, was incorporated in the reign of King Charles the Second; and, by the especial favour of that monarch, it was designated The Royal Society,—a distinction which every succeeding monarch of these realms has been pleased to continue.

"A sense of duty and gratitude has led us, in the first instance, to offer up our tribute of condolence and congratulation to the King's Most Excellent Majesty, on the demise of our late revered Sovereign, and upon his own accession to the crown of his ancestors.

"Having discharged this duty to our Patron, and having just obtained his Royal Signature, we now venture to request Your Majesty's powerful support and cheering protection; and that Your Majesty will be graciously pleased to receive us into your Royal Favour. Our humble expectations rest on the ground of public utility. The great object of our Institution has been, and will, we trust, long continue to be, the promotion of natural science in all its branches. With our success in this respect, the prosperity of our common country is closely and indissolubly connected.

"Accept then, Royal Madam, the assurances of our duty and allegiance; and suffer us, in conclusion, to express our warmest wishes for Your Majesty's uninterrupted welfare and peace.

"May the great Giver of all good pour down his blessings on your royal person! May it be consistent with the wise and merciful dispensations of his Providence, that, together with Your Majesty, our generous and beloved Sovereign may long continue to watch over the interests, and to direct the labours, of a free, loyal, and united people!"

To which Her Majesty was pleased to return the following most gracious answer.

"I thank you very cordially for your expressions of affectionate attachment towards myself, and dutiful congratulations towards the King, on his accession to the throne of his ancestors.

"Firmly convinced as I am that the diffusion of natural science, guarded and protected by religion and morality, must be conducive to the prosperity of this country, the President and Fellows of the Royal Society may always depend upon my countenance and approbation, as I am convinced they will receive the support and protection of the King."

The Members of the Council were then severally presented to Her Majesty by His Royal Highness, and had the honour of kissing Her Majesty's hand.

---

### March 17.

### HIS ROYAL HIGHNESS THE DUKE OF SUSSEX,

President, in the Chair.

The Rev. Thomas Smith Turnbull, M.A.; Christopher R. M. Talbot, Esq.; and Henry Fox Talbot, Esq.; were elected Fellows of the Society.

The following Presents were received, and thanks ordered for them:—

The Nautical Almanac and Astronomical Ephemeris for the Year 1833. 8vo. (3 Copies.)—*Presented by the Lords Commissioners of the Admiralty.*

Second Supplement to an Essay on the Theory of Systems of Rays. By W. R. Hamilton, Esq. 4to.—*The Author.*

On the Error of a received Principle of Analysis, respecting Functions which vanish with their Variables. By the same. 4to.—*The Author.*

Address of Earl Stanhope, President of the Medico-Botanical Society, for the Anniversary Meeting, Jan. 1831. 8vo.—*The Author.*

A Catalogue of Books in the Library of the Company of Clockmakers of the City of London. 8vo.—*The Company.*

Kongl. Vetenskaps-Academiens Handlingar, för år 1827. 8vo.

———————— för år 1828. 8vo.—*The Academy.*

Register öfrer Kongl. Vetenskaps-Academiens Handlingar, ifrån och med 1813, till och med 1825.—*The Academy.*

Årsberättelser om Vetenskapernas Framsteg, afgifne af Kongl. Vetenskaps-Academiens Embetsmän, d. 31 Mars 1828.—*The Academy.*

Memorie della Reale Accademia delle Scienze di Torino. Tomo XXXIV. 4to.—*The Academy.*

Handleiding tot het Vinden der Ware Sterkte van het Acidum Aceticum door vande Digtheid. Na voorafgegane Proeven opgesteld door A. van der Toorn. 4to.—*The Author.*

A Paper was read, entitled, "Proposed Plan for supplying filtered Water to the Metropolis and its Suburbs." By Lemuel Wellman Wright, Esq., Civil Engineer. Communicated by T. J. Pettigrew, Esq. F.R.S.

The author, after giving extracts from the Report of the Commissioners appointed by His late Majesty to inquire into the supply